The law in the 21st century: a Sisyphean struggle to keep up with technological evolutions?

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Abstract: Society has changed tremendously in the last decade. It still is in a transitional phase because of different technological developments. These evolutions affect our way of thinking, doing business, communicating, interaction and the work/life balance. Some argue that the legal framework will need a fundamental make-over as well. The question that arises is whether some of the existing long-standing legal principles are compatible with technological evolutions or whether new legislation will need to be adopted. The article will try to provide an answer to these fundamental issues through a case-study of recent evolutions in two different fields of law, namely the use of social media in court proceedings for procedural law and the introduction of self-driving cars in traffic for liability law.

Keywords: Law and Technology – Service of Process – Social Media – Self-Driving Cars

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Summary: The article examines whether existing legal principles are compatible with technological evolutions or whether new legislation will need to be implemented. We will examine two evolutions more thoroughly, namely the use of social media for service of process and the commercialisation of autonomous vehicles. A new phenomenon has arisen in a number of common law jurisdictions around the world. In Australia, the United States, New Zealand, Canada and England there are examples of cases in which social media platforms were used to notify the defendant of the commencement of civil proceedings (this is called service of process). In civil law nations, effecting service of process through social media is completely unknown. This is remarkable in light of the obvious importance of this topic for the continental EU Member States, given the digital reality and the continuous objective to increase the functionality of dispute resolution. Although it is difficult to predict whether the legislator in civil law countries will endorse social media service, it is argued that social media service could be valuable as an additional method in Belgium when the defendant does not have a known address in order to strengthen the likelihood of actual notice. Another technological evolution relates to the commercialisation of autonomous vehicles. The increased use of self-driving cars has several benefits. However, legal challenges will come to the surface as well. One of these relates to the question who should be held liable for damage caused by autonomous vehicles. At the present time, things are quite clear. The manufacturer of (parts of) the vehicle or its driver can in most cases be held liable under national or supranational law for the damage caused by the accident. The article will show that things are more complex with self-driving cars and that the existing legal framework might need some changes.

1. Introduction

Society has changed tremendously in the last decade. It still is in a transitional phase because of different technological developments. These evolutions affect our way of thinking, doing business, communicating, interaction and the work/life balance. It is, therefore, not surprising that several aspects related to those technological evolutions are increasingly being studied in academia[3] and

[3] See in general: BROWNSWORD, Roger, SCOTFORD, Eloise & YEUNG, Karen, *The Oxford Handbook of Law, Regulation and Technology*, 1st ed., Oxford, Oxford University Press, 2017; CALO, Ryan, FROOMKIN, Michael & KERR, Ian, *Robot Law*, 1st ed., Cheltenham, Edward Elgar Publishing, 2016.

addressed by policymakers.[4] The question that arises from a legal point of view is whether some of the existing long-standing legal principles are compatible with technological evolutions or whether new legislation will need to be adopted. In this regard, it is often argued that the law lags behind technological development.[5] Technological evolutions may expose gaps in the existing legal framework or may give rise to undesirable conflicts and call for changes.[6] We will try to provide an answer to these fundamental issues through a case-study of recent evolutions in two different fields of law, namely the use of social media for notice of court proceedings in the area of procedural law (part 2) and the introduction of self-driving cars (SDCs) or autonomous vehicles in the area of liability law (part 3). We will conclude by giving some (general) recommendations that can be taken into account by policymakers, judges and lawyers when creating or applying the law in the "society of tomorrow" (part 4).

2. The Use of Social Media in Service of Process

After some preliminary considerations on the use of social media in services of process (part 2.1), we will describe the current common law trend of effecting service of process through social networking sites (part 2.2). We then give a short overview of how service of process is effectuated in Belgium, as an example of a civil law country (part. 2.3). Finally, having taken note of the service of process framework in Belgium and the absence of social media as a form of acceptable notice, we reflect on the possible introduction of such service within that jurisdiction (part 2.4).

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[4] Reference can be made to the working of the EU High Level Group GEAR 2030. The Group discussed the main challenges for the automobile industry in the next fifteen years and made recommendations to ensure that the relevant policy, legal and public support framework is in place for the roll-out of highly automated and connected vehicles by 2030 (High Level Group on the Competitiveness and Sustainable Growth of the Automotive Industry in the European Union (GEAR 2030), "Ensuring that Europe has the most competitive, innovative and sustainable automotive industry of the 2030s and beyond", October 2017). The European Parliament has also adopted a resolution on the 16th of February 2017 with recommendations to the Commission on civil law rules on robotics (European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103INL)).

[5] See for example: MOSES, Bennett, "Agents of Change: How the Law "Copes" with Technological Change", *Griffith Law Review*, no. 20, 2011, 763-794, 764; MARCHANT, Gary, ALLENBY, Braden & HERKERT, Joseph, *The Growing Gap Between Emerging Technologies and Legal-Ethical Oversight*: *The Pacing Problem*, 1st ed., New York, Springer Science & Business Media, 2011.

[6] LEENES, Ronald *et al*, "Regulatory challenges of robotics: some guidelines", *Law, Innovation and Technology*, vol. 9, no. 1, 2017, 1-44, 7.

2.1. Preliminary Considerations

Imagine you open the Facebook Messenger app and you see the new message notification. It is a message informing you that you have been sued and that you are to appear in court as defendant in a family law case involving proof of paternity. Or: you are browsing through Instagram when you suddenly receive a DM (Direct Message). There is a lawsuit pending against you. You have been served in an insurance matter through the DM. Or: you often use LinkedIn to keep track of your contacts' occupations and achievements. One day your LinkedIn inbox indicates that you have a new message. The LinkedIn message contains a summons and a claim form. A foreign company is taking you to court for trademark infringement. Futuristic scenarios? Think again! These situations have actually taken place in the last decade in Australia[7], Canada[8] and the United States[9] respectively.

In a number of common law jurisdictions around the world courts have allowed plaintiffs to notify the defendant of the commencement of legal proceedings (*i.e.* service of process) through the use of social networking platforms. The list of social media is long but the ones most often used for service of process are Facebook, Twitter, LinkedIn and Instagram. When mentioning this relatively recent line of private law cases to lawyers with civil law backgrounds, reactions ranging from mild amused surprise to utter shock and disgust can be observed. In civil law nations effecting service of process through social media is completely unknown.[10] Whereas the use of e-mail for service purposes seems to have become increasingly more well established, the use of social media as an avenue for notification of the commencement of proceedings appears to be in a whole different ballpark. As such, scholars in continental EU Member States (by which we refer to those EU countries that belong to the civil law tradition) have not yet addressed this relatively new development within the common law world. This is unfortunate as getting insight into the practice might prove valuable for enhancing our own service rules. This contribution, therefore, undertakes an analysis

[7] Federal Magistrates Court of Australia, Byrne & Howard, 21 April 2010, [2010] FMCAfam 509.

[8] A report of the case is available here: ROBINSON, Alex, Toronto lawyer serves claim with Instagram, 2 February 2018, http://www.canadianlawyermag.com/legalfeeds/author/alex-robinson/toronto-lawyer-serves-claim-with-instagram-15294/, read on 2 May 2018.

[9] United States District Court, Eastern District of Virginia, Alexandria Division, WhosHere, Inc. v. Gokhan Orun, 20 February 2014, 2014 WL 670817.

[10] There is, to our knowledge, only one example where social media were used in the transmission of judicial documents. In order to initiate Dutch court proceedings Stichting BREIN (Bescherming Rechten Entertainment Industrie Nederland) served the Pirate Bay (a website registered in Sweden) through Twitter and Facebook, in addition to the conventional methods of service (Rechtbank Amsterdam, 30 July 2009, no. 428212 / KG ZA 09-1092 WT/RV).

of the reported cases to subsequently contemplate on a general level whether social media service will ever form part of the service methods on the EU continent.

2.2. Social Media Service in Common Law: State of Play

As mentioned, common law countries are the laboratory in which service through social media platforms has been allowed to flourish. After a brief discussion of the origin of the use of social media in service of process (part A), we will examine the conditions laid down by the case law more thoroughly (part B).

A. Origin

The actual cradle of social media service is to be situated in Australia (at least judging by the reported cases). The ball begun rolling with a case between a mortgage provider and a couple that no longer made its repayments.[11] In *MKM v. Corbo & Poyser* the defendants had taken out a home refinancing loan with MKM Capital but had failed to keep up with payments. They not respond to e-mails from MKM's attorneys and did not appear in court. MKM obtained a default judgment permitting seisure of the property. Before the judgment could be executed it had to be served on the defendants. However, defendants had moved away, had switched jobs and had changed their phone numbers. Repeated efforts at personal service as well as service by mail and publication did not lead to the desired result. MKM therefore made the ground-breaking move of seeking permission to effect service through the defendants' Facebook accounts. The lawyers had handily located both defendants on the biggest social networking site. To that end they used the personal information the couple had supplied themselves during the loan application process. They were able to link the defendants' date of birth and their e-mail addresses to the Facebook profiles (which were, fortunately for the plaintiff, not protected by stringent privacy settings). Furthermore, they found that both defendants were friends on Facebook. Master Harper of the Supreme Court of the Australian Capital Territory therefore gave plaintiff MKM the green light to inform defendants of the entry and terms of the default judgment via a private Facebook message. In addition, the order had to be served via e-mail and by leaving a sealed copy at their last known address.

Although the germ of social media service lies Down Under, the current centre of gravity for this rather contentious method of service has arguably

[11] Supreme Court of the Australian Capital Territory, MKM Capital Pty Ltd. v. Corbo & Poyser, 16 December 2008, case no. SC 608, text on file with the authors.

shifted to the United States. The first approval by an American court came in the case of *Jessica Mpafe v. Clarence Mpafe*.[12] A wife wished to divorce her husband but it was believed he had left the territory of the United States.[13] She had a suspicion that he had moved back to Ivory Coast. As she had no physical address for her soon-to-be ex-husband, she petitioned the court for approval to send notice by general delivery, where the post office holds mail until the recipient comes to the post office to pick it up.[14] Judge Kevin S. Burke noted: "*While the Court considered publication in a legal newspaper, it is unlikely that Respondent would ever see this. It is more likely that Respondent could receive notice on the internet. The traditional way to get service by publication is antiquated and is prohibitively expensive. Service is critical, and technology provides a cheaper and hopefully more effective way of finding Respondent.*"[15] The judge is further quoted as stating that: "*Nobody, particularly poor people, is going to look at the legal newspaper to notice that their spouse wants to get divorced.*"[16] He ordered service to include, but not be limited to, contact via any Facebook, Myspace, or other social networking site, contact via e-mail and contact through information that would appear through an internet search engine such as Google.[17]

B. Conditions

State court litigation is governed by state law provisions whereas the Federal Rules of Civil Procedure (FRCP) determine the service regime for federal cases. For domestic service Rule 4(e)(1) FRCP refers to state provisions as it permits following state law for serving a summons in an action brought in courts of general jurisdiction in the state where the district court is located or where service is made. Under state law more unconventional methods of service are

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[12] Fourth District Family Court of Minnesota (Hennepin County), Jessica Mpafe v. Clarence Mpafe, 10 May 2011, No. 27-FA-11-3453.

[13] VAN HORN, Hans, "Evolutionary Pull, Practical Difficulties, and Ethical Boundaries: Using Facebook to Serve Process on International Defendants", *Global Business & Development Law Journal*, vol. 26, 2013, 555-576, 566; EISENBERG, Alyssa, "Keep Your Facebook Friends Close and Your Process Server Closer: The Expansion of Social Media Service of Process to Cases Involving Domestic Defendants", *San Diego Law Review*, vol. 51, 2014, 779-822, 790.

[14] WARD, Stephanie, "Our Pleasure to Serve You: More Lawyers Look to Social Networking Sites to Notify Defendants", *American Bar Association Journal*, vol. 97, no. 10, 2011, 14-16, 14.

[15] Fourth District Family Court of Minnesota (Hennepin County), Jessica Mpafe v. Clarence Mpafe, 10 May 2011, No. 27-FA-11-3453.

[16] WARD, Stephanie, "Our Pleasure to Serve You: More Lawyers Look to Social Networking Sites to Notify Defendants", *American Bar Association Journal*, vol. 97, no. 10, 2011, 14.

[17] Fourth District Family Court of Minnesota (Hennepin County), Jessica Mpafe v. Clarence Mpafe, 10 May 2011, No. 27-FA-11-3453.

available in comparison to the federal rules. In some states catch-all provisions are in place. §308(5) of the New York Civil Practice Law and Rules (N.Y. CPLR), for instance, states that the court may order service in any manner, if the other (traditional) methods of service provided by § 308 N.Y. CPLR are impracticable. Impracticability however "*does not require proof of due diligence or of actual prior attempts to serve a party under the other provisions of the statute*".[18] For service abroad, Rule 4(f)(3) FRCP gives the judge the possibility to order any method he deems appropriate, as long as the method is not prohibited by international agreement. The provision offers this option without any need for the plaintiff to first attempt service via the other methods listed in Rule 4(f) FRCP.[19]

A scrutiny of the available cases reveals that the majority of courts have approved of social media service in combination with another form of service. In *Mpafe v. Mpafe*, for example, service through social networking platforms was ordered together with *inter alia* e-mail service.[20] In *Ferrarese v. Shaw* plaintiff begun proceedings against his ex-wife who had disappeared with their daughter. The woman remained elusive and could not be served. The federal court decided that service on the ex-wife should be effected via e-mail, Facebook message and certified mail on defendant's last known address and on defendant's sister.[21] In *Federal Trade Commission v. PCCare247 Inc.* the Federal Trade Commission brought suit against five foreign defendants who were involved in a fraudulent organisation trying to extract money from American citizens by deceiving them into believing that their computers were infected. On the basis of Rule 4(f)(3) FRCP the New York District Court granted the FTC's request for permission to serve documents on the defendants via e-mail and Facebook.[22] The Family Court decision in *Noel Biscocho v. Anna Maria Antigua* is an excellent example of the judicial hesitance to completely step away from traditional methods of service in favour of the newly discovered service channel offered by social media. A father who was seeking to modify an order of child support for his son based on the alleged emancipation of the boy was allowed to serve the mother via Facebook. However, he also had to follow up with a mailing of the summons and the

[18] District Court for the Southern District of New York, Fortunato v. Chase Bank, 7 June 2012, 2012 WL 2086950; District Court for the Southern District of New York, S.E.C. v. HGI, Inc., 8 November 1999, 99 Civ. 3866, 1999 WL 1021087.

[19] United States Court of Appeals, Ninth Circuit, Rio Properties, Inc. v. Rio International Interlink, 20 March 2002, 284 F.3d, 1007, at 1015.

[20] Fourth District Family Court of Minnesota (Hennepin County), Jessica Mpafe v. Clarence Mpafe, 10 May 2011, No. 27-FA-11-3453.

[21] United States District Court, Eastern District of New York, Giovanni Ferrarese v. Vinda Shaw, 19 January 2016, 164 F.Supp.3d 361 (2016).

[22] District Court for the Southern District of New York, FTC v. PCCare247 Inc., 7 March 2013, 2013 WL 841037.

petition to the mother's last known address, even though the court recognised that prior service at that address had been unsuccessful (the mother had moved without leaving a forwarding address) and her physical whereabouts uncertain.[23]

This cautious attitude is, however, not shared by all courts. *Baidoo v. Blood-Dzraku* appears to be the first reported case in which the court approved service by Facebook message as the sole method of service. The plaintiff was a married woman who wanted to divorce her husband. She had no physical address for him and he could not be served in person. Therefore, the wife petitioned the court for service via Facebook. The court did not require service via publication as a backup method to Facebook, deeming the former to be "*essentially statutorily authorized non-service*".[24] Similarly, in *St. Francis Assisi v. Kuwait Finance House* the matter to be decided was whether the plaintiff was entitled to damages from a number of defendants in connection with the financing of terrorist organisation ISIS and the subsequent slaying of Assyrian Christians in Iraq and Syria. The plaintiff attempted to serve one of the defendants, a Kuwaiti-born Salafi sheikh, but came up empty. It, therefore, turned to the United States District Court for the Northern District of California, seeking permission to effect service via Twitter, the American social networking platform used by the defendant to collect money to fund terrorist activities. The court agreed with service through Twitter as the only method to be used.[25]

The available case law tends to impose two requirements regarding the social media account to be served. First, the plaintiff has to provide the court with evidence that the account actually belongs to the defendant (authentication requirement). Second, the plaintiff needs to demonstrate that the defendant makes regular use of his account (evidence of use requirement). Both are logical conditions given the fact that the Due Process Clause of the Fourteenth Amendment to the U.S. Constitution imposes that notice should be "*reasonably calculated, under all circumstances, to apprise interested parties of the pendency of the action and afford them an opportunity to present their objections*".[26]

In *Baidoo v. Blood-Dzraku* the plaintiff was aided by the existence of conversations between her and her husband on Facebook. She submitted an affidavit

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[23] Family Court of the State of New York (County of Richmond), Noel B. v. Anna Maria A., 12 September 2014, case no. F00787-13/14B, 2014 N.Y. Misc. LEXIS 4708; COLEMAN, Kristina, "Beyond *Baidoo v. Blood-Dzraku:* Service of Process Through Facebook and Other Social Media Platforms Through an Indiana Lens", *Indiana Law Review*, vol. 50, 2017, 645-671, 660.

[24] Supreme Court of New York County, Baidoo v. Blood-Dzraku, 27 March 2015, 48 Misc 3d 316.

[25] United States District Court for the Northern District of California, St. Francis Assisi v. Kuwait Finance House, et al., 30 September 2016, 2016 WL 5725002.

[26] U.S. Supreme Court, Mullane v. Central Hanover Bank & Trust Co., 24 April 1950, 339 U.S. 314 (1950).

to which she annexed copies of the exchanges between her and the defendant on Facebook and in which she identified the defendant as the subject of the photographs on the Facebook page in question. While such statements do not constitute absolute proof, the court was satisfied that the account did belong to the untraceable defendant. As to evidence of regular use, the court was equally satisfied as the exchanges between the plaintiff and the defendant indicated that the latter regularly logged into his account, countering the risk of him not seeing the summons until the time to respond had passed.[27] Conversely, in *Fortunato v. Chase Bank* the defendant wanted to bring the plaintiff's daughter into the litigation. The request for service through the Facebook account of the daughter was denied for reasons of uncertainty regarding the authenticity of said account. The court argued that: "*anyone can make a Facebook profile using real, fake, or incomplete information, and thus, there is no way for the Court to confirm whether the Nicole Fortunato the investigator found is in fact the third-party defendant to be served*."[28]

2.3. Short Overview of Service of Process in Belgium

In Belgium civil proceedings are initiated either by a writ of summons or by means of a petition. The most common method is the delivery of the writ of summons to the defendant by the bailiff.[29] The Belgian Judicial Code lists a number of methods to effect this service of process (art. 33 *et seq*.). The bailiff will respect a certain order and will try to serve the defendant in person first. Service in person means that the bailiff hand delivers the writ of summons to the defendant. It can take place wherever the defendant can be found. If the defendant refuses to accept service, this refusal will not prevent service in person from being accomplished. The bailiff makes a note of this refusal on the writ.[30]

If service in person is not possible, service can be effected at the domicile or, in absence of a domicile, the place of residence of the defendant, by leaving a copy of the writ with a relative, servant or agent, provided that the person is 16 years old or above.[31] If the previous method of service is not possible, the bailiff

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[27] Supreme Court of New York County, Baidoo v. Blood-Dzraku, 27 March 2015, 48 Misc 3d 314-315.

[28] District Court for the Southern District of New York, Fortunato v. Chase Bank, 7 June 2012, 2012 WL 2086950.

[29] TAELMAN, Piet & VAN SEVEREN, Claudia, *Civil procedure in Belgium*, 1st ed., Mechelen, Wolters Kluwer, 2018, 89.

[30] Art. 33 Belgian Judicial Code.

[31] Art. 35 Belgian Judicial Code.

can leave a copy of the writ in a sealed envelope at the domicile or, in absence of a domicile, the place of residence of the defendant. The next business day at the latest the bailiff will send a letter to the defendant via registered mail, informing him of the date and time of the bailiff's visit and of the possibility to obtain a copy of the writ at the bailiff's office during a period of three months.[32] The sending of the registered letter is a precautionary measure, without any effect on the service.[33]

Since 31 December 2016, the date of the entry into force of the so-called Potpourri III Act of 4 May 2016, the possibility for the bailiff exists to serve through e-mail. In civil matters the bailiff may choose the method of service (personal service or electronic service via e-mail) depending on the circumstances specific to the case.[34]

The bailiff can either use the "gerechtelijk elektronisch adres" (a unique e-mail address, issued by the government[35]) of the defendant or, for people who do not have such an address, the "adres van elektronische woonstkeuze" (a regular e-mail address, not issued by the government)[36]. In the latter case explicit consent needs to be obtained from the defendant each time the bailiff wishes to serve him through that e-mail address.[37] To that end the bailiff will send a request for consent to the "adres van elektronische woonstkeuze" of the defendant.[38] In both cases the e-mail sent by the bailiff does not contain the actual document to be served. Rather, the content of the documents can only be consulted on the digital platform (the Registry) created for that purpose. The defendant can only gain access to the content of the document after having identified and authenticated himself using his electronic id card (eID) and pincode or a technical equivalent method.

Within 24 hours of sending the service or the request for consent, the bailiff will receive a confirmation message from the Registry, indicating that service has actually been effected. If no such confirmation is received within that time frame, electronic service is not possible and needs to be effected in person.[39] When the defendant opens the e-mail message, the Registry notifies the bailiff. If no notification of opening is received within 24 hours of sending the service or

[32] Art. 38, §1 Belgian Judicial Code.

[33] Cass. 17 December 1998, *Arr. Cass*. 1998, 1155.

[34] Art. 32quater/3, §2 Belgian Judicial Code.

[35] Art. 32, 5° Belgian Judicial Code.

[36] Art. 32, 6° Belgian Judicial Code.

[37] Art. 32quater/1, §1, second sentence Belgian Judicial Code.

[38] Art. 32quater/1, §2, first sentence Belgian Judicial Code.

[39] Art. 32quater/1, §2, first and third sentence *iuncto* art. 32quater/3, §3 Belgian Judicial Code.

the request for consent, the bailiff will notify the defendant the next business day through regular mail that electronic service has been effected.[40]

In case the defendant does not have a known domicile or place of residence in Belgium, service abroad will have to take place. Service in another EU Member State will be regulated by the EU Service Regulation.[41] For service in non-EU states that are a member of the Hague Service Convention, that Convention will apply. If the non-EU country where the defendant is domiciled or resides, is not bound by the Hague Convention, service is effected by registered letter through air mail.[42]

If the defendant does not have a known domicile or place of residence at all (neither in Belgium nor abroad), the bailiff will serve the writ on the public prosecutor of the jurisdiction of the court which will deal with the claim.[43]

2.4. Looking into the Crystal Ball: Social Media Service in Belgium?

In this part, we will not attempt to forecast whether the Belgian legislator will ever decide to incorporate social media service as a service method. We will, however, set out which choices can be made and will signal some of the issues that will have to be dealt with.

First of all, one can wonder which advantages social media offer. One distinct advantage of social media service lies in the fact that it is able to achieve a high likelihood of actual notice. Users of social media platforms typically access their accounts on a regular basis.[44] A recent press release by Facebook, for instance, showed that there were 1.32 billion daily active users on average worldwide for June 2017 and 2.01 billion monthly active users as of 30 June 2017.[45] Social media are oftentimes accessed on mobile devices. On these devices users run applications that push instant notifications alerting the account holder of

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[40] Art. 32quater/1, §2, *in fine* Belgian Judicial Code.

[41] Regulation (EC) No 1393/2007 of the European Parliament and of the Council of 13 November 2007 on the service in the Member States of judicial and extrajudicial documents in civil or commercial matters (service of documents), and repealing Council Regulation (EC) No 1348/2000, *OJ* L 324.

[42] Art. 40, first paragraph Belgian Judicial Code.

[43] Art. 40, second paragraph Belgian Judicial Code.

[44] KNAPP, Keeley, "#serviceofprocess @socialmedia: Accepting Social Media for Service of Process in the 21st Century", *Louisiana Law Review*, vol. 74, no. 2, 2014, 547-579, 564

[45] See in this regard: https://investor.fb.com/investor-news/press-release-details/2017/Facebook-Reports-Second-Quarter-2017-Results/default.aspx

activity on his profile.[46] Besides, if service is performed via a private Facebook message or via a post on the defendant's Facebook wall, the likelihood of actual notice is even amplified. Under the default settings, the defendant will receive a notification through e-mail of the message or of the post and any subsequent comments.[47]

Compared to the second-newest kid on the block, e-mail service, social media holds a few trump cards. In case of service via e-mail there is no possibility to determine whether the e-mail address belongs to the defendant unless the defendant states so himself.[48] A social media account, on the other hand, can be scrutinised to verify the identity of the holder if the privacy settings allow it. Additionally, e-mail is more prone to spam attacks.[49] In that regard, social media networks fare better.[50] Spam messages are less common on social media platforms and malicious messages are less problematic because users can often view the sender's profile without opening the message or they can adjust their settings to disallow messages from individuals who they have not added as "friends".[51]

Having argued that service through social media platforms can have an added value, a subsequent question would be whether there is a need for this type of service to be implemented in Belgium. It is unlikely that the Belgian legislator will introduce social media service as a self-standing independent method. For Belgium, where e-mail service is still in its infancy, this would be too radical and controversial. In our opinion, there could nevertheless be a place for this innovative method in the Belgian system.

In part 2.3 it was explained that service on defendants who do not have a known domicile or place of residence is replaced by service on the public prosecutor of the jurisdiction of the competent court.[52] In Belgium the "Nationale

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[46] UPCHURCH, Angela, ""Hacking" Service of Process: Using Social Media to Provide Constitutionally Sufficient Notice of Process", *UALR Review*, vol. 38, 2016, 559-625, 601.

[47] District Court for the Southern District of New York, FTC v. PCCare247 Inc., 7 March 2013, 2013 WL 841037, 5.

[48] KNAPP, Keeley, "#serviceofprocess @socialmedia: Accepting Social Media for Service of Process in the 21st Century", *Louisiana Law Review*, vol. 74, no. 2, 2014, 569.

[49] WOLBER, Jeffrey, "Opening a Can of Worms and Viruses: The Impact of E-Service on E-Mail Users Everywhere", *New York Law School Law Review*, vol. 61, 2016-2017, 449-470, 450, footnote 1.

[50] SHULTZ, Andriana, "Superpoked and Served: Service of Process via Social Networking Sites", *University of Richmond Law Review*, vol. 43, 2009, 1497-1528, 1525, footnote 205 (statement made in the context of Facebook).

[51] WOLBER, Jeffrey, "Opening a Can of Worms and Viruses: The Impact of E-Service on E-Mail Users Everywhere", *New York Law School Law Review*, vol. 61, 2016-2017, 450, footnote 1.

[52] Art. 40, second paragraph Belgian Judicial Code.

Kamer van Gerechtsdeurwaarders" (the National Chamber of Bailiffs) does not keep statistics on the number of times service is in that regard effected on the public prosecutor. In the Netherlands, on the contrary, such figures are available. The Dutch service rules also require that a defendant without a known domicile or place of residence be served through the office of the public prosecutor at the court where the claim will be heard. In addition, an abstract of the writ must be published in the "Staatscourant".[53] The "Staatscourant" is an official online gazette containing *inter alia* different types of judicial announcements.[54] An Act of 11 February 2015 made the use of this online tool compulsory since 1 July 2015.[55] Before that date these so-called "public writs" were published in daily newspapers. According to the Explanatory Memorandum accompanying the Act 45.000 public writs are served each year.[56] Additionally, it is stated that bailiffs receive little or no response to public writs published in newspapers.[57] The Dutch legislator considered that the publication of these writs on a public site on the internet would increase the odds that the defendants would see it, leading to the putting into use of the "Staatscourant".[58]

There is no reason why these findings cannot be transposed to Belgium. It is extremely likely that the "artificial" service on the prosecutor does not inform the persons in question, given the results in the Netherlands where service on the prosecutor is even combined with service by publication. It is here that social media service could play a role. Belgian lawmakers could make it obligatory for plaintiffs to undertake a reasonable attempt to serve the elusive defendant via his social media channels, if any. In the Netherlands this idea has already been suggested by the "Adviescommissie Burgerlijk Procesrecht" (Advisory Committee on Civil Procedural Law) in the build-up to the adoption of the Act of 11 February 2015.[59] It can be expected that such a subsidiary place for social media service will prompt less resistance than embracing it as a full-blown mechanism. Furthermore, because social media service is deployed as a supplement to an established method, it will alleviate at least some of the sceptical concerns raised

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[53] Art. 54.2 Dutch Code of Civil Procedure.

[54] See for more information: https://zoek.officielebekendmakingen.nl/zoeken/staatscourant.

[55] Wet van 11 februari 2015 tot wijziging van het Wetboek van Burgerlijke Rechtsvordering en enige andere wetten in verband met bekendmakingen aan personen zonder bekende woon- of verblijfplaats, *Stb*. 2015, 82.

[56] Memorie van Toelichting, 4.

[57] Memorie van Toelichting, 2.

[58] Memorie van Toelichting, 2.

[59] Letter of 19 September 2013 concerning consultatiedocument Wijziging van het wetboek van burgerlijke rechtsvordering en enige andere wetten in verband met bekendmakingen aan personen zonder bekende woon- of verblijfplaats, 2, no. 3.

by its opponents. In that way, the policy choice would correspond to the U.S. example where social media service is, in most instances, offered in combination with another more conventional method (see part 2.2.B).

As to the concrete organisation of social media service, the Belgian legislator will face further issues. Certain safeguards relating to the authentication and regular use of the account will need to be construed. The American experience might serve as a source of inspiration. A further specific difficulty that can be identified relates to the bailiff who has to effect the service. Does the bailiff have to use an official account or can he use the account of the plaintiff or can he even send the notice via a fake account?[60] In case social media service is used as a supplementary method for defendants without a known address, service could perhaps be entrusted to the plaintiff (or his lawyer). Time will tell to what extent Belgium will "connect" with social media, if at all.

3. Case Study: Autonomous Vehicles and Liability

Another example we will discuss are autonomous vehicles. The increased use of such vehicles needs to be seen in a broader perspective of robots and artificial intelligence (part 3.1). Once some preliminary considerations have been discussed, we will proceed with an analysis of aspects related to the liability for damage caused by self-driving cars (part 3.2).

3.1. Preliminary Considerations on Robots

Finding an appropriate definition of a 'robot' is not straightforward due to its "a-technical nature, both from an engineering and a legal point of view".[61] Calo concludes that a robot is a machine with three qualities: (1) a robot can sense its environment, (2) a robot has the capacity to process the information it senses, and (3) a robot is organised to act directly upon its environment.[62] Defining artificial intelligence (AI) might be even more challenging as there is no

[60] In the United States a similar discussion exists in relation to the ethical rules governing the conduct of lawyers performing social media service. See for example: VAN HORN, Hans, "Evolutionary Pull, Practical Difficulties, and Ethical Boundaries: Using Facebook to Serve Process on International Defendants", *Global Business & Development Law Journal*, vol. 26, 2013, 570-574.

[61] BERTOLINI, Andrea, "Robots as Products: The Case for a Realistic Analysis of Robotic Applications and Liability Rules", *Law, Innovation and Technology*, vol. 5, no. 2, 2013, 214-247, 219.

[62] CALO, Ryan, Robots in American Law, University of Washington School of Law Research Paper no. 2016-04, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2737598, 6, read on 15 April 2018; CALO, Ryan, "Robotics and the Lessons of Cyberlaw", *California Law Review*, vol. 103, no. 3, 2015, 513-563, 529.

consensus on this concept.[63] Artificial intelligence has been the subject of much discussion and has caused a lot of confusion.[64] AI is an umbrella term comprised of many different techniques[65] and is best understood as a set of techniques aimed at approximating some aspect of human or animal cognition by using machines. In this regard, the concept of machine learning is important. Machine learning implies that a system does not only rely on predefined instructions to determine its behaviour but also on the independent analysis of large amounts of collected data. It refers to the capacity of computer algorithms to automatically learn or improve in performance on a task over time.[66]

Regardless of the precise definition of both concepts, human activities are increasingly being replaced by robots.[67] Robots are becoming prevalent in our daily, social and professional life.[68] Several examples can be used as an illustration. Collaborative robots or 'CoBots' have been designed to physically interact with humans in a shared workspace.[69] Prototypes of robots such as Riba can be used in the health sector to perform heavy physical nursing care tasks requiring human contact (e.g. lifting a bedridden patient from the bed to a wheelchair and

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[63] See for more information: TURING, Alan Mathison, "Computing Machinery and Intelligence", *Mind*, no. 49, 1950, 433-460; RUSSELL, Stuart & NORVIG, Peter, *Artificial Intelligence: A Modern Approach*, 3rd ed., New Jersey, Pearson New International, 2010.

[64] KOK, Joost Nico, *Artificial Intelligence*, 1st ed., Oxford, EOLSS Publications, 2009, 2.

[65] CALO, Ryan, "Artificial Intelligence Policy: A Primer and Roadmap", *U.C. Davis Law Review*, vol. 51, 2017, 399-435, 405.

[66] CALO Ryan, "Artificial Intelligence Policy: A Primer and Roadmap", *U.C. Davis Law Review*, vol 51, 2017, 405; SURDEN, Harry & WILLIAMS, Mary-Anne, "Technological Opacity, Predictability, and Self-Driving Cars", *Cardozo Law Review*, vol. 38, 2016, 121-181, 147.

[67] HALLEVY, Gabriel, "The Criminal Liability of Artificial Intelligence Entities - From Science Fiction to Legal Social Control", *Akron Intellectual Property Journal*, vol. 4, no. 2, 2010, 171-201, 172. See for an overview: IVANOV, Stanislav Hristov, "Robonomics - Principles, Benefits, Challenges, Solutions", *Yearbook of Varna University of Management,* vol. 10, 2017, 283-293.

[68] LEENES, Ronald *et al*, "Regulatory challenges of robotics: some guidelines", *Law, Innovation and Technology*, vol. 9, no. 1, 2017, 7.

[69] See for more information: PREIMESBERGER, Chris, Why CA Technologies is Moving into Collaborative Robotics, eWeek, 17 January 2018, http://www.eweek.com/innovation/why-ca-technologies-is-moving-into-collaborative-robotics, read on 20 April 2018.

back).[70] Robots have been used to run a hotel[71] or sell coffee in stores.[72] There are also growing concerns in the international community regarding so-called "killer robots" that might be used in armed conflicts.[73] Robots are increasingly used in the legal profession as well. Lawyers will eventually be replaced by algorithms,[74] while cases might in the future be adjudicated by an artificial intelligence judge.[75] A more prominent example is the rise of self-driving cars or autonomous vehicles.[76] According to recent predictions, fully autonomous vehicles could already be available within five to twenty years.[77] One could, therefore, say that the challenges posed by robots will only become more acute in light of the explosive growth of the robotics industry over the next decade. In sum, we "*are*

[70] MUKAI, Toshiharu *et al*., "Development of a Nursing-Care Assistant Robot RIBA That Can Lift a Human in Its Arms", *2010 IEEE/RSJ International Conference on Intelligent Robots and Systems*, 18-22 October 2010, 5996-6001, 5996.

[71] RAJESH, Monisha, Inside Japan's first robot-staffed hotel, The Guardian, 14 August 2015, https://www.theguardian.com/travel/2015/aug/14/japan-henn-na-hotel-staffed-by-robots, read on 19 April 2018.

[72] X, Nestlé employs fleet of robots to sell coffee machines in Japan, The Guardian, 1 December 2014, https://www.theguardian.com/technology/2014/dec/01/nestle-robots-coffee-machines-japan-george-clooney-pepper-android-softbank, read on 19 April 2018.

[73] See for example: CROOTOF, Rebecca, "The Killer Robots Are Here: Legal and Policy Implications", *Cardozo Law Review*, no. 36, 2015, 1837-1916; SMITH, Mark, Is 'killer robot' warfare closer than we think?, 25 August 25 2017, BBC News, http://www.bbc.com/news/business-41035201, read on 30 April 2018.

[74] See for example: X, Ready for robot lawyers? How students can prepare for the future of law, The Guardian, 31 July 2017, https://www.theguardian.com/law/2017/jul/31/ready-for-robot-lawyers-how-students-can-prepare-for-the-future-of-law, read on 22 April 2018. See, however: REMUS, Dana & LEVY, Frank, "Can Robots Be Lawyers? Computers, Lawyers, and the Practice of Law", *Georgetown Journal of Legal Ethics*, vol. 30, 2017, 501-558.

[75] ALETRAS, Nikolaos, TSARAPATSANIS, Dimitrios, PREOTIUC-PIETRO, Daniel & LAMPOS, Vasileios, "Predicting judicial decisions of the European Court of Human Rights: a Natural Language Processing perspective", *PeerJ Computer Science*, no. 2, 2016, https://peerj.com/articles/cs-93/, read on 15 April 2018. See in this regard also: CALO Ryan, Robots in American Law, University of Washington School of Law Research Paper no. 2016-04, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2737598, 25-32, read on 18 April 2018.

[76] See for more information: SURDEN, Harry & WILLIAMS, Mary-Anne, "Technological Opacity, Predictability, and Self-Driving Cars", *Cardozo Law Review*, vol. 38, 2016, 121-181; ZOHN, Jeffrey, "When robots attack: How should the law handle self-driving cars that cause damages", *University of Illinois Journal of Law, Technology & Policy*, vol. 2015, no. 2, 2015, 461-485.

[77] ANDERSON James, KALRA Nidhi, STANLEY Karlyn, SORENSEN Paul, SAMARAS Constantine & OLUWATOLA Tobi, Autonomous Vehicle Technology – A Guide for Policymakers, California, RAND, 4, https://www.rand.org/pubs/research_reports/RR443-2.html, read on 17 April 2018.

in the midst of a robotics revolution",[78] which is poised to be the next transformative technology.[79]

This increased use of robots will have several advantages. Robots are more accurate and efficient because they are faster and can process information better than humans.[80] As a consequence, they can perform many tasks better than their human counterparts.[81] Companies from various economic sectors already rely on robotics and artificial intelligence to decrease costs, generate revenues, enhance product quality and improve their competitiveness.[82] In addition to these general benefits, robots can also have more specific advantages for the sector where they are used. Take the example of self-driving cars. Transport will become more time efficient with autonomous car technology.[83] Human passengers can occupy themselves with other professional or leisure activities - as they do no longer have to pay attention to the road. The use of SDCs will also lead to a better flow of traffic and less accidents, which results in fewer traffic jams. All these factors have a positive influence on productivity and the work/life balance.[84] One of the most important advantages of autonomous vehicle technology is that traffic will become much safer with software operating the vehicle. The

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[78] CALO, Ryan, Robots in American Law, University of Washington School of Law Research Paper no. 2016-04, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2737598, 3, read on 15 April 2018.

[79] CALO, Ryan, "Open Robotics", *Maryland Law Review*, vol. 70, 2011, 571-613, 571.

[80] TZAFESTAS, Spyros, *Roboethics: A Navigating Overview*, 1st ed., Athens, Springer, 2015, 147.

[81] DEITEL, Harvey & DEITEL, Barbara, *Computers and Data Processing: International Edition*, 1st ed., Orlando, Academic Press, 2014, 434.

[82] IVANOV, Stanislav Hristov, "Robonomics - Principles, Benefits, Challenges, Solutions", *Yearbook of Varna University of Management,* vol. 10, 2017, 283-285, 283-293 with further references.

[83] See for example: ZOHN Jeffrey R., "When robots attack: How should the law handle self-driving cars that cause damages", *University of Illinois Journal of Law, Technology & Policy*, vol. 2015, no. 2, 2015, 471; DUFFY, Sophia & HOPKINS, Jamie, "Sit, Stay, Drive: The Future of Autonomous Car Liability", *SMU Science & Technology Law Review*, vol. 16, 2013, 453-480, 475 & 479.

[84] DE BRUYNE, Jan & TANGHE, Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, vol. 8, no. 3, 2018, 325 with further references.

number of accidents will reduce as computers are generally much better drivers than their human equivalents.[85]

At the same time, however, the introduction of robots also poses many challenges. Robots and artificial intelligence will have implications on various facets of our society. For instance, different studies illustrate that robotisation will affect the labour market.[86] SDCs might replace persons nowadays employed in the transportation sector or other related industries.[87] Experts also predict a decline in the so-called 'crash economy' once autonomous cars are commonly used. Involved in that economy are *inter alia* garages, lawyers, insurance companies, physical therapists and, ironic as it is, the car industry itself.[88] The increased use of robots will also pose several challenges from a legal or regulatory point of view.[89] Without going into further detail, robots might affect human rights such as privacy or the freedom of speech,[90] influence court proceedings or decision

[85] See for example: ZOHN, Jeffrey, "When robots attack: How should the law handle self-driving cars that cause damages", *University of Illinois Journal of Law, Technology & Policy*, vol. 2015, no. 2, 2015, 471; GURNEY, Jeffrey, "Sue my car not me: products liability and accidents involving autonomous vehicles", *University of Illinois Journal of Law, Technology & Policy*, vol. 2013, no. 2, 2013, 247-277, 250-251; DE BRUYNE, Jan & TANGHE, Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, vol. 8, no. 3, 2018, 325 with further references.

[86] See for example: ACEMOGLU, Daron & RESTREPO, Pascual, Robots and Jobs: Evidence from US Labor Markets, MIT Department of Economics Working Paper No. 17-04, 17 March 2017, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2941263, read on 28 April 2018; FREY, Carl Benedikt & OSBORNE, Michael, "The future of employment: How susceptible are jobs to computerisation?", *Technological Forecasting and Social Change*, vol. 114, 2017, 254-280, 254.

[87] DE BRUYNE Jan & TANGHE Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, vol. 8, no. 3, 2018, 326-327 with further references.

[88] ANDERSON James, KALRA Nidhi, STANLEY Karlyn, SORENSEN Paul, SAMARAS Constantine, OLUWATOLA Tobi, Autonomous Vehicle Technology – A Guide for Policymakers, California, RAND, xvii & 38-40, https://www.rand.org/pubs/research_reports/RR443-2.html, read on 17 April 2018; DE BRUYNE, Jan & TANGHE, Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, vol. 8, no. 3, 2018, 326-327 further references.

[89] See in general: LEENES, Ronald *et al*, "Regulatory challenges of robotics: some guidelines", *Law, Innovation and Technology*, vol. 9, no. 1, 2017, 2.

[90] See for example: BALKIN, Jack, "Free Speech in the Algorithmic Society: Big Data, Private Governance, and New School Speech Regulation", *UC Davis Law Review*, vol. 51, 2018, 1149-1210; MASSARO, Toni & NORTON, Helen, "Siri-ously? Free Speech Rights and Artificial Intelligence», *Northwestern University Law Review*", vol. 110, 2016, 1169-1194.

making processes[91] and raise questions of corporate law.[92] More importantly, liability issues will also become important in the future as robots will inevitably cause damage. In 2015, for instance, it was reported in the press that a robot killed a man at a Volkswagen factory in Germany.[93] Examples of accidents with autonomous vehicles are also interesting in this regard and will be examined in the next part.

3.2. The Liability Framework and Autonomous Vehicles

Vehicles will not suddenly become fully autonomous or self-driving. Instead, technology will gradually take over a user's control over the vehicle. Technology has already partly taken over some of the user's tasks in controlling the vehicle. Examples thereof are adaptive cruise control, lane keeping assistance and automatic parking systems. These forms of partial vehicle are covered by the umbrella term Advanced Driver Assistance Systems (ADAS).[94] Vehicles will eventually be able to take persons from one place to another without any human interference.[95] In that case, one can speak of a fully autonomous or driverless

[91] See for example: REMUS, Dana & LEVY, Frank, "Can Robots Be Lawyers? Computers, Lawyers, and the Practice of Law", *Georgetown Journal of Legal Ethics*, vol. 30, 2017, 501; COGLIANESE, Cary & LEHR, David, "Regulating by Robot: Administrative Decision Making in the Machine-Learning Era", *Georgetown Law Journal*, vol. 105, 2017, 1147-1223.

[92] See for example: MÖSLEIN, Florian, "Robots in the Boardroom: Artificial Intelligence and Corporate Law", in: BARFIELD, Woodrow & PAGALLO, Ugo, *Research Handbook on the Law of Artificial Intelligence*, 1st ed., Edward Elgar, 2018, forthcoming.

[93] HUGGLER, Justin, Robot kills man at Volkswagen plant in Germany, The Telegraph, 2 July 2015, https://www.telegraph.co.uk/news/worldnews/europe/germany/11712513/Robot-kills-man-at-Volkswagen-plant-in-Germany.html, read on 1 May 2018.

[94] See for more information: SURDEN, Harry & WILLIAMS, Mary-Anne, "Technological Opacity, Predictability, and Self-Driving Cars", *Cardozo Law Review*, vol. 38, 2016, 134-135; VAN WEES Kiliaan, "Vehicle Safety Regulations and ADAS: Tensions Between Law and Technology", in: X, *IEEE International Conference on Systems, Man and Cybernetics*, The Hague, 2004, 4011-4016.

[95] See for an overview of the technology used in autonomous vehicles: SURDEN, Harry & WILLIAMS, Mary-Anne, "Technological Opacity, Predictability, and Self-Driving Cars", *Cardozo Law Review*, vol. 38, 2016, 129-150; ANDERSON, James, KALRA, Nidhi, STANLEY, Karlyn, SORENSEN, Paul, SAMARAS, Constantine & OLUWATOLA, Tobi, Autonomous Vehicle Technology – A Guide for Policymakers, California, RAND, 55-74, https://www.rand.org/pubs/research_reports/RR443-2.html, read on 17 April 2018.

vehicle.[96] Today, only prototypes of such vehicles exist. They are currently being tested on the road by companies such as Google and Tesla.[97]

Despite the increased safety as a result of SDCs, road accidents will not suddenly disappear. Autonomous vehicles will share the road with 'regular' non-autonomous cars and other road users during a long transition period. Recent accidents show that the technology used in autonomous vehicles is indeed not entirely flawless. Technological sensors do not work perfectly in exceptional circumstances such as stormy weather or heavy rainfalls. The autopilot sensors of a Tesla car, for instance, were not able to distinguish a white tractor-trailer crossing the highway from the bright sky above, leading to a fatal crash.[98] In February 2016, an autonomous vehicle hit a bus because it did not know that long vehicles are less inclined to stop and give way.[99] More recently, several newspapers reported an accident with a Tesla autopilot vehicle, which resulted in the driver's death.[100]

Against this background, the question arises whether the legal framework dealing with the liability for damage caused by SDCs will need a fundamental make-over[101] or instead minor changes might be sufficient. In other words, one has to assess "*whether tort liability rules – as they are currently shaped – are suited to govern the "car minus driver" complexity, while simultaneously holding on to*

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[96] SURDEN, Harry & WILLIAMS, Mary-Anne, "Technological Opacity, Predictability, and Self-Driving Cars", *Cardozo Law Review*, vol. 38, 2016, 132-133.

[97] See for an extensive discussion and further references: DE BRUYNE, Jan & TANGHE, Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, vol. 8, no. 3, 2018, 324-371; DE BRUYNE, Jan & VANLEENHOVE, Cedric, "The Rise of Self-Driving Cars: Is the Private International Law Framework for non-contractual obligations posing a bump in the road?", *IALS Student Law Review*, vol. 5, no. 1, 2018, 14-26.

[98] See in this regard: Tesla's Blog, A Tragic Loss, 30 June 2016, https://www.teslamotors.com/blog/tragic-loss, read on 22 April 2018.

[99] See in this regard: BOWLES, Nellie, Google self-driving car collides with bus in California, accident report says, The Guardian, 1 March 2016, https://www.theguardian.com/technology/2016/feb/29/google-self-driving-car-accident-california, read on 19 April 2018.

[100] See for example: HULL, Dana & SMITH, Tim, Tesla Driver Died Using Autopilot, With Hands Off Steering Wheel, Bloomberg Technology, 31 March 2018, https://www.bloomberg.com/news/articles/2018-03-31/tesla-says-driver-s-hands-weren-t-on-wheel-at-time-of-accident, read on 1 May 2018; BOUDETTE, Neal, Fatal Tesla Crash Raises New Questions About Autopilot System, New York Times, 31 March 2018, https://www.nytimes.com/2018/03/31/business/tesla-crash-autopilot-musk.html, read on 1 May 2018.

[101] SURDEN, Harry & WILLIAMS, Mary-Anne, "Technological Opacity, Predictability, and Self-Driving Cars", *Cardozo Law Review*, vol. 38, 2016, 136.

their theoretical basis".[102] In any case, some changes to the legal framework will be inevitable. The Belgian Highway Code, for example, is not yet adapted to the introduction of autonomous car technology as it still requires that each vehicle has a 'driver'.[103] The driver must at all times be able to perform the necessary driving actions and must have his vehicle under control.[104] It is conceivable that the situation in other EU Member States will be quite similar. The existing liability rules might also need some changes with the commercialisation of SDCs. Reliance on fault-based liability will become uncertain in the context of autonomous vehicles. It will, for instance, not be easy to determine who the 'driver' is in an autonomous vehicle and whether he can be held liable for a violation of the law that is actually committed by the vehicle itself (e.g. crossing a red light). Research also showed that it is by no means straightforward to hold the user of an autonomous vehicle liable for a negligent act in supervising the technology.[105]

Liability in traffic-related matters will, therefore, evolve from a fault-based mechanism towards forms of strict liability. This means that victims will have to target other parties. There are different alternatives in national law. In Belgium, for instance, a party could sue the custodian of a defective object under Article 1384, first paragraph, of the Belgian Civil Code (BCC). That article imposes a strict liability regime for the custodian of a defective object for the damage caused by that object.[106] Another more interesting possibility is to file a claim against the manufacturer of the vehicles or the software under the EU

[102] DAVOLA, Antonio, A Model for Tort Liability in a World of Driverless Cars: Establishing a Framework for the Upcoming Technology, 1 February 2018, 2, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3120679, read on 1 May 2018.

[103] Art. 8.1. Koninklijk besluit van 1 december 1975 houdende algemeen reglement op de politie van het wegverkeer en van het gebruik van de openbare weg, published on 9 December 1975 (Highway Code).

[104] Art. 8.3. Highway Code. See in this regard also the decision by the Belgian Court of Cassation, 17 January 1989, *Arr. Cass.* 1988, 599 & *Verkeersrecht-Jurisprudentie* 1989, 181.

[105] See for an extensive discussion and further references: DE BRUYNE, Jan & TANGHE, Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, vol. 8, no. 3, 2018, 344-347.

[106] See for an extensive discussion and further references: DE BRUYNE, Jan & TANGHE, Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, vol. 8, no. 3, 2018, 348-354.

Product Liability Directive.[107] Article 1 of the Directive stipulates that the producer will be held liable for damage caused by a defect in his product.[108] The question arises whether the Product Liability Directive is adapted to the reality of self-driving cars. In this regard, the GEAR 2030 High Level Group concluded that the motor insurance and product liability directives are sufficient at least for those systems expected by 2020. After that date, however, the application of the Product Liability Directive risks to create a number of problems.[109] Against this background, we will examine whether this framework is inadequate and out of tune with the reality of SDCs by focusing on two elements,[110] namely whether software can be qualified as product (part A) and the moment when the vehicle is put into circulation (part B).[111]

A. Qualification of Software

Article 2 of the Product Liability Directive defines a product as all movables, with the exception of primary agricultural products and game, even though incorporated into another movable or into an immovable. There is a debate on the question whether software qualifies as product or not. There are several reasons why software cannot be seen as product. For instance, software might be qualified as a service and not as a product. In addition, the Directive only mentions 'movables'. Therefore, it relates to tangible goods only. It would otherwise make no sense to explicitly include electricity in the scope of the Directive.[112] This requirement is problematic for software products. Software is a collection

[107] Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products, *OJ* L 210. See for a discussion of product liability and self-driving cars in the United States: SMITH, Bryant Walker, "Automated Driving and Product Liability", *Michigan State Law Review*, vol. 2017, no. 1, 2017, 1-74; GURNEY, Jeffrey K., "Sue my car not me: products liability and accidents involving autonomous vehicles", *University of Illinois Journal of Law, Technology & Policy*, vol. 2013, no. 2, 2013, 257-277.

[108] Article 1 Product Liability Directive. According to Article 5, a product is defective if it does not provide the safety that a person is entitled to expect, taking all circumstances into account.

[109] High Level Group on the Competitiveness and Sustainable Growth of the Automotive Industry in the European Union (GEAR 2030), "Ensuring that Europe has the most competitive, innovative and sustainable automotive industry of the 2030s and beyond", October 2017, 43-44.

[110] DAVOLA, Antonio, A Model for Tort Liability in a World of Driverless Cars: Establishing a Framework for the Upcoming Technology, 1 February 2018, 2, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3120679, read on 1 May 2018.

[111] See for an extensive discussion and further references: DE BRUYNE, Jan & TANGHE, Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, vol. 8, no. 3, 2018, 355-364; 367-370.

[112] Article 2 *in fine* Product Liability Directive.

of data and instructions that is imperceptible for the human eye. A software system is thus often regarded as intangible. Accordingly, it might not fall within the scope of the Product Liability Act.[113]

At the same time, however, there are also some reasons why software should fall within the scope of the Product Liability Directive. Software might be seen as the *object* of a service. It is, therefore, covered by the Directive. Software can also be qualified as a product because it is captured on a tangible medium or device (e.g. CD-ROM or USB). This has been affirmed by the European Commission.[114] Software *an sich* might be considered as a material good as well. The Directive could apply to software even if it is qualified as an intangible good. After all, the inclusion of electricity clarifies that the drafters of the Directive aimed at a wide material scope. Legislators did not think of software in the early 1980s as personal computers only became commercially widespread during the second half of the 1980s. It is thus conceivable that software, in a teleological interpretation of the Directive, falls within the scope of the Directive. The European Court of Justice might come to a similar conclusion in the future. The inclusion of software in the Directive would also reflect the current economic reality in which software is a commercial product just as any other product that may entail risks for users and third parties.[115]

B. Putting the Self-Driving Car into Circulation

Pursuant to Article 7(b) of Product Liability Directive, the manufacturer of the product can escape liability when he proves that it is probable that the defect causing the damage did not exist at the time when the product was put into circulation or that this defect came into being afterwards. If software is qualified as a product, any update thereof could be considered an act by which the producer brings a new product into circulation. However, it becomes more difficult with so-called self-learning systems. These systems are not periodically updated but continually improve themselves. For defects that are created in this way, a moment of putting the product into circulation cannot be indicated as the manufacturer did not perform an act to that end. The same reasoning also applies to the liability of the manufacturer of the vehicle. The changes made by a self-lear-

[113] See for an extensive discussion and further references: DE BRUYNE Jan & TANGHE Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, no. 8, 2018, 355-357.

[114] See in this regard: Written Question no. 706/88 of 5 July 1988 and Answer by Lord Cockfield on behalf of the Commission on 15 November 1988, *OJ* 114/42, 8 May 1989.

[115] See for an extensive discussion and further references: DE BRUYNE, Jan & TANGHE, Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, vol. 8, no. 3, 2018, 355-357.

ning system and the updates performed by the software producer can create defects for which the car manufacturer is no longer liable. Indeed, those defects did not exist at the time when he put the vehicle into circulation. Although the vehicle meets the definition of a product, its manufacturer might thus easily escape liability if the damage is caused by a dysfunction in the software. One could argue that Article 7(b) Product Liability Directive should be inapplicable in those circumstances. This makes it possible for victims to file a claim against the manufacturer of the software even when the defect is created through the continuous self-development of software.[116]

4. Concluding Remarks

The article examined whether some of the existing legal principles in two different fields are compatible with technological evolutions. As to service of process via social media, the article explored the remarkable finding that some courts in common law countries have allowed the notice of the commencement of civil proceedings to be effected via one or more social media accounts belonging to the defendant. In contrast, in continental EU jurisdictions this phenomenon does not exist. The article laid the conditions imposed by American courts for this type of service bare and subsequently gave an overview of the Belgian procedural framework. Even though it remains to be seen whether the Belgian legislator will ever be tempted by this novel method of service, it is submitted that social media service could be useful as a second layer of subsidiary notice when the defendant does not have a known address. With regard to self-driving cars, some legal changes at the national level are inevitable. Legislation dealing with road safety is not yet adopted to the introduction of autonomous vehicles. We have also shown that the application of some of the concepts used in the EU Product Liability Directive might become problematic when SDCs will be commercialised. For instance, the moment of putting the product into circulation might be incompatible with autonomous systems. In any case, when policymakers would change the legal framework, they should take into account that a minor modification of one aspect (e.g. qualification of software) can have major consequences on the liability of the manufacturers of software or of the self-driving vehicle. Therefore, we suggest a balanced and well-considered approach when it comes to adapting the existing legal framework to technological evolutions.[117]

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[116] DE BRUYNE, Jan & TANGHE, Jochen, "Liability for Damage Caused by Autonomous Vehicles: a Belgian Perspective", *Journal of European Tort Law*, vol. 8, no. 3, 2018, 362-363 & 370.

[117] See in this regard also: DE BRUYNE, Jan & WERBROUCK, Jarich, "Merging self-driving cars with the Law", *Computer and Security Law Review*, vol. 34, no. 5, 2018, forthcoming.